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PATENT & TRADEMARK OFFICE

<110> Cole, David
Cummins, Ian
Edwards, Robert

<120> Plant Genes

<130> A33083-PCT-USA 072667.0127

<140> 09/508,710
<141> 2000-07-10

<150> PCT/GB98/02802
<151> 1998-09-16

<150> GB 971972.1
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<170> FastSEQ for Windows Version 3.0

<210> 1
<211> 1085
<212> DNA
<213> Triticum aestivum L.

<220>
<221> CDS
<222> (46)...(711)
<223> Glutathione S transferase

<400> 1

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caaacacaag cacagatcgg tcgagattca aggcaaccgg gagca atg gcg ggc gag      57
                                                    Met Ala Gly Glu
                                                     1

aag ggg ctg gtg ctg ctg gac ttc tgg gtg agc ccg ttc ggg cag cgc      105
Lys Gly Leu Val Leu Leu Asp Phe Trp Val Ser Pro Phe Gly Gln Arg
 5                  10                  15                  20

gtg cgc atc gcg ctg gcc gag aag ggc ctg ccc tac gag tac gcg gag      153
Val Arg Ile Ala Leu Ala Glu Lys Gly Leu Pro Tyr Glu Tyr Ala Glu
                 25                  30                  35

gag gac ctg atg gcc ggc aag agc gac cgc ctc ctc cgc gcc aac ccg      201
Glu Asp Leu Met Ala Gly Lys Ser Asp Arg Leu Leu Arg Ala Asn Pro
             40                  45                  50

gtg cat aag aag atc ccg gtg ctc ctc cac gac ggc cgt gcc gtc aac      249
```

```
Val His Lys Lys Ile Pro Val Leu Leu His Asp Gly Arg Ala Val Asn
         55                  60                  65

gag tcc ctc atc atc ctc cag tac ctg gag gag gcc ttc ccg gac gcg      297
Glu Ser Leu Ile Ile Leu Gln Tyr Leu Glu Glu Ala Phe Pro Asp Ala
     70                  75                  80

ccc gct ctg ctc ccc tcc gac ccc tac gcg cgc gcg cag gcc cgc ttc      345
Pro Ala Leu Leu Pro Ser Asp Pro Tyr Ala Arg Ala Gln Ala Arg Phe
 85                  90                  95                 100

tgg gcc gac tac gtc gac aag aag gtc tac gac tgc ggc tcc cgc ctc      393
Trp Ala Asp Tyr Val Asp Lys Lys Val Tyr Asp Cys Gly Ser Arg Leu
                105                 110                 115

tgg aag ctc aag ggc gag ccg cag gcg cag gcg cgc gcc gag atg ctg      441
Trp Lys Leu Lys Gly Glu Pro Gln Ala Gln Ala Arg Ala Glu Met Leu
            120                 125                 130

gac atc ctc aag acc ctc gac ggc gcg ctc ggg gac aag ccc ttc ttc      489
Asp Ile Leu Lys Thr Leu Asp Gly Ala Leu Gly Asp Lys Pro Phe Phe
        135                 140                 145

ggc ggc gac aag ttc ggg ttc gtc gac gcc gcc ttc gcg ccc ttc acc      537
Gly Gly Asp Lys Phe Gly Phe Val Asp Ala Ala Phe Ala Pro Phe Thr
    150                 155                 160

gcg tgg ttc cac agc tac gag agg tac ggc gag ttc agc ctg ccg gag      585
Ala Trp Phe His Ser Tyr Glu Arg Tyr Gly Glu Phe Ser Leu Pro Glu
165                 170                 175                 180

gtg gcg ccc aag atc gcc gcg tgg gcc aag cgc tgc ggc gag cgg gag      633
Val Ala Pro Lys Ile Ala Ala Trp Ala Lys Arg Cys Gly Glu Arg Glu
                185                 190                 195

agc gtc gcc aag agc ctc tac tcg ccg gac aag gtg tac gac ttc atc      681
Ser Val Ala Lys Ser Leu Tyr Ser Pro Asp Lys Val Tyr Asp Phe Ile
            200                 205                 210

ggc ctg ctc aag aag aag tac ggc atc gag taggcgcgcc gacggacgga       731
Gly Leu Leu Lys Lys Lys Tyr Gly Ile Glu
        215                 220

cggacgggcc atgcaggcga cagccggccc gccgtccgga gggaagcaac aaataaatca    791
gggagcgatt tgggtggcct acaatgcgta cgtctggata gagtatttct ttctttcttt    851
cttcgtggaa taaagtgctc cgtgtgtgtg tggttggtgg ttgttggttg gatcagtcag    911
tgtgtgtggg tgcgtgttgt gtactcagta ctcgtgatgt gtgtgtgtgt caatgtgtca    971
accctggtct tcggtggggg cagcaccgag ttgccacctg ccattccatt tccattccgg   1031
gcgatgaata aattaaaaaa gagtctcatt tgtttaaaaa aaaaaaaaaa aaaa         1085
```

<210> 2
<211> 222
<212> PRT

<213> Triticum aestivum L.

<400> 2

```
Met Ala Gly Glu Lys Gly Leu Val Leu Leu Asp Phe Trp Val Ser Pro
 1               5                  10                  15
Phe Gly Gln Arg Val Arg Ile Ala Leu Ala Glu Lys Gly Leu Pro Tyr
            20                  25                  30
Glu Tyr Ala Glu Glu Asp Leu Met Ala Gly Lys Ser Asp Arg Leu Leu
        35                  40                  45
Arg Ala Asn Pro Val His Lys Lys Ile Pro Val Leu Leu His Asp Gly
    50                  55                  60
Arg Ala Val Asn Glu Ser Leu Ile Ile Leu Gln Tyr Leu Glu Glu Ala
65                  70                  75                  80
Phe Pro Asp Ala Pro Ala Leu Leu Pro Ser Asp Pro Tyr Ala Arg Ala
                85                  90                  95
Gln Ala Arg Phe Trp Ala Asp Tyr Val Asp Lys Lys Val Tyr Asp Cys
            100                 105                 110
Gly Ser Arg Leu Trp Lys Leu Lys Gly Glu Pro Gln Ala Gln Ala Arg
        115                 120                 125
Ala Glu Met Leu Asp Ile Leu Lys Thr Leu Asp Gly Ala Leu Gly Asp
    130                 135                 140
Lys Pro Phe Phe Gly Gly Asp Lys Phe Gly Phe Val Asp Ala Ala Phe
145                 150                 155                 160
Ala Pro Phe Thr Ala Trp Phe His Ser Tyr Glu Arg Tyr Gly Glu Phe
                165                 170                 175
Ser Leu Pro Glu Val Ala Pro Lys Ile Ala Ala Trp Ala Lys Arg Cys
            180                 185                 190
Gly Glu Arg Glu Ser Val Ala Lys Ser Leu Tyr Ser Pro Asp Lys Val
        195                 200                 205
Tyr Asp Phe Ile Gly Leu Leu Lys Lys Lys Tyr Gly Ile Glu
    210                 215                 220
```

<210> 3
<211> 865
<212> DNA
<213> Triticum aestivum L.

<220>
<221> CDS
<222> (54)...(725)
<223> WIC 1

<400> 3

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ggaactcaac cattgatctt caagaagcgg aagcaaacag agcaaaaggt gtg atg        56
                                                          Met
                                                           1

gcg gcg ccg gcg gtg aag gtg tac ggg tgg gcg atg tcg ccg ttc gtg      104
Ala Ala Pro Ala Val Lys Val Tyr Gly Trp Ala Met Ser Pro Phe Val
             5                  10                  15

gcg cgc gcg ctg ctg tgc ctg gag gag gcc ggc gtg gag tac gag ctc      152
Ala Arg Ala Leu Leu Cys Leu Glu Glu Ala Gly Val Glu Tyr Glu Leu
```

```
          20                  25                  30

gtc ccc atg agc cgc gag gcc ggc gac cac cgc cag ccc gac ttc ctc      200
Val Pro Met Ser Arg Glu Ala Gly Asp His Arg Gln Pro Asp Phe Leu
     35                  40                  45

gcc cgg aac ccc ttc ggc cag gtc ccc gtt ctc gag gac ggc gac ctc      248
Ala Arg Asn Pro Phe Gly Gln Val Pro Val Leu Glu Asp Gly Asp Leu
 50                  55                  60                  65

acc atc ttc gag tcg cgc gcc gtc gcg agg cac gtg ctg cgc aag cac      296
Thr Ile Phe Glu Ser Arg Ala Val Ala Arg His Val Leu Arg Lys His
                 70                  75                  80

aaa ccg gag ctg ctg ggc tcc ggc tcg ccg gag tcg gcg gcg atg gtg      344
Lys Pro Glu Leu Leu Gly Ser Gly Ser Pro Glu Ser Ala Ala Met Val
             85                  90                  95

gac gtg tgg ctg gag gtg gag gcc cac cag cac cag acc ccg gcg ggc      392
Asp Val Trp Leu Glu Val Glu Ala His Gln His Gln Thr Pro Ala Gly
        100                 105                 110

acc atc gtc atg cag tgc atc ctc acc ccg ttc ctc ggc tgc cag cgc      440
Thr Ile Val Met Gln Cys Ile Leu Thr Pro Phe Leu Gly Cys Gln Arg
    115                 120                 125

gac cag gcc gcc atc gac gag aac gcg gca aag ctg acg aat ctg ttc      488
Asp Gln Ala Ala Ile Asp Glu Asn Ala Ala Lys Leu Thr Asn Leu Phe
130                 135                 140                 145

gac gtg tac gag gcg cgc ctg tcg gcg tcg agg tac ctt gcc ggg gag      536
Asp Val Tyr Glu Ala Arg Leu Ser Ala Ser Arg Tyr Leu Ala Gly Glu
                150                 155                 160

gcg gtc agc ctc gcg gac ctc agc cac ttc ccg ttc atg cga tac ttc      584
Ala Val Ser Leu Ala Asp Leu Ser His Phe Pro Phe Met Arg Tyr Phe
            165                 170                 175

atg gac acc gag tac gcg tcg ctg gtg gag gag cgc ccg cac gtg aag      632
Met Asp Thr Glu Tyr Ala Ser Leu Val Glu Glu Arg Pro His Val Lys
        180                 185                 190

gcg tgg tgg gag gag ttc aag gcc agc ccg gcg gcg aag agg gtg acg      680
Ala Trp Trp Glu Glu Phe Lys Ala Ser Pro Ala Ala Lys Arg Val Thr
    195                 200                 205

gag ttc atg ccg cca aac ttc ggg ttc gga aag aag gca gag aag          725
Glu Phe Met Pro Pro Asn Phe Gly Phe Gly Lys Lys Ala Glu Lys
210                 215                 220

tgatgacaag aacgaacacc gagcgaacat gttgtgtggt ctgtgcgacc cgaccatggc    785
tcaatgtttt gggctgtttg tgtttcacgc atgaatgaat aaaacaaaat gcttttgggt    845
ttcaaaaaaa aaaaaaaaaa                                               865
```

<210> 4
<211> 224
<212> PRT
<213> Triticum aestivum L.

<400> 4

```
Met Ala Ala Pro Ala Val Lys Val Tyr Gly Trp Ala Met Ser Pro Phe
 1               5                  10                  15
Val Ala Arg Ala Leu Leu Cys Leu Glu Glu Ala Gly Val Glu Tyr Glu
            20                  25                  30
Leu Val Pro Met Ser Arg Glu Ala Gly Asp His Arg Gln Pro Asp Phe
        35                  40                  45
Leu Ala Arg Asn Pro Phe Gly Gln Val Pro Val Leu Glu Asp Gly Asp
    50                  55                  60
Leu Thr Ile Phe Glu Ser Arg Ala Val Ala Arg His Val Leu Arg Lys
65                  70                  75                  80
His Lys Pro Glu Leu Leu Gly Ser Gly Ser Pro Glu Ser Ala Ala Met
                85                  90                  95
Val Asp Val Trp Leu Glu Val Glu Ala His Gln His Gln Thr Pro Ala
            100                 105                 110
Gly Thr Ile Val Met Gln Cys Ile Leu Thr Pro Phe Leu Gly Cys Gln
        115                 120                 125
Arg Asp Gln Ala Ala Ile Asp Glu Asn Ala Ala Lys Leu Thr Asn Leu
    130                 135                 140
Phe Asp Val Tyr Glu Ala Arg Leu Ser Ala Ser Arg Tyr Leu Ala Gly
145                 150                 155                 160
Glu Ala Val Ser Leu Ala Asp Leu Ser His Phe Pro Phe Met Arg Tyr
                165                 170                 175
Phe Met Asp Thr Glu Tyr Ala Ser Leu Val Glu Glu Arg Pro His Val
            180                 185                 190
Lys Ala Trp Trp Glu Glu Phe Lys Ala Ser Pro Ala Ala Lys Arg Val
        195                 200                 205
Thr Glu Phe Met Pro Pro Asn Phe Gly Phe Gly Lys Lys Ala Glu Lys
    210                 215                 220
```

<210> 5
<211> 930
<212> DNA
<213> Triticum aestivum L.

<220>
<221> CDS
<222> (60)...(725)
<223> WIC 2

<400> 5

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cacgcgtcca tctccaagaa gcggaagcta gtggagcaga gcaaaccaag caaggttgg      59
atg gcg ccg gcg gtg aag gtg tac ggg tgg gcc gtg tcg ccg ttc gtg      107
Met Ala Pro Ala Val Lys Val Tyr Gly Trp Ala Val Ser Pro Phe Val
 1               5                  10                  15

gcg cgc cca ctg ctg tgc ctg gag gag gcc ggc gtc gag tac gag ctc      155
Ala Arg Pro Leu Leu Cys Leu Glu Glu Ala Gly Val Glu Tyr Glu Leu
```

```
                20                  25                  30

gtg tcc atg agc cgc gcg gcc ggc gac cac cgc cag ccg gac ttc ctc      203
Val Ser Met Ser Arg Ala Ala Gly Asp His Arg Gln Pro Asp Phe Leu
         35                  40                  45

gcc cgg aac ccc ttc ggc cag gtc ccc gtc ctc gag gac ggc gac ctc      251
Ala Arg Asn Pro Phe Gly Gln Val Pro Val Leu Glu Asp Gly Asp Leu
     50                  55                  60

acc ctc ttc gag tcg cgc gcg atc gcg agg cac gtg ctc cgg aag cac      299
Thr Leu Phe Glu Ser Arg Ala Ile Ala Arg His Val Leu Arg Lys His
 65                  70                  75                  80

aag ccg gag ctg ctg ggc tgc ggc tcg ccg gag gcg gag gcg atg gtg      347
Lys Pro Glu Leu Leu Gly Cys Gly Ser Pro Glu Ala Glu Ala Met Val
                 85                  90                  95

gac gtg tgg ctg gag gtg gag gcc cac cag tac aac ccc gcg gcc agc      395
Asp Val Trp Leu Glu Val Glu Ala His Gln Tyr Asn Pro Ala Ala Ser
            100                 105                 110

gcc atc gtg gtg cag tgc atc atc ttg ccg cta ctg ggc ggc gcg cgg      443
Ala Ile Val Val Gln Cys Ile Ile Leu Pro Leu Leu Gly Gly Ala Arg
        115                 120                 125

gac cag gcg gtg gtg gac gag aac gta gcc aag ctc aag aag gtg ctg      491
Asp Gln Ala Val Val Asp Glu Asn Val Ala Lys Leu Lys Lys Val Leu
    130                 135                 140

gag gtg tac gag gca cgg ctg tcg gcg tcc agg tac ctc gcc ggg gac      539
Glu Val Tyr Glu Ala Arg Leu Ser Ala Ser Arg Tyr Leu Ala Gly Asp
145                 150                 155                 160

gac atc agc ctc gcc gac ctc agc cac ttc ccc ttc acg cgc tac ttc      587
Asp Ile Ser Leu Ala Asp Leu Ser His Phe Pro Phe Thr Arg Tyr Phe
                165                 170                 175

atg gag acg gag tac gcg ccg ctg gtg gcg gag ctc ccc cac gtg aac      635
Met Glu Thr Glu Tyr Ala Pro Leu Val Ala Glu Leu Pro His Val Asn
            180                 185                 190

gcg tgg tgg gag ggg ctc aag gcc agg ccg gcc gcg agg aag gtg acg      683
Ala Trp Trp Glu Gly Leu Lys Ala Arg Pro Ala Ala Arg Lys Val Thr
        195                 200                 205

gag ctc atg ccg ccg gac ctt ggg ctt gga aag aaa gca gag              725
Glu Leu Met Pro Pro Asp Leu Gly Leu Gly Lys Lys Ala Glu
    210                 215                 220

tagtgatgac tgccgccaac gttcaccagg atcgagcaag tcactgtcga gtctccggtt    785
ttgcgttgta cggcaccggg gcaccggcct atattttctg taccagtggc tcgtgttttg    845
atgttttagt ctcacgcttg aataaaatgc aagatatacc catcggttct aaaagaaaaa    905
```

aaaaaaaaaa aaaaaaaaaa aaaaa 930

<210> 6
<211> 222
<212> PRT
<213> Triticum aestivum L.

<400> 6

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Met Ala Pro Ala Val Lys Val Tyr Gly Trp Ala Val Ser Pro Phe Val
 1               5                  10                  15
Ala Arg Pro Leu Leu Cys Leu Glu Glu Ala Gly Val Glu Tyr Glu Leu
            20                  25                  30
Val Ser Met Ser Arg Ala Ala Gly Asp His Arg Gln Pro Asp Phe Leu
        35                  40                  45
Ala Arg Asn Pro Phe Gly Gln Val Pro Val Leu Glu Asp Gly Asp Leu
    50                  55                  60
Thr Leu Phe Glu Ser Arg Ala Ile Ala Arg His Val Leu Arg Lys His
65                  70                  75                  80
Lys Pro Glu Leu Leu Gly Cys Gly Ser Pro Glu Ala Glu Ala Met Val
                85                  90                  95
Asp Val Trp Leu Glu Val Glu Ala His Gln Tyr Asn Pro Ala Ala Ser
            100                 105                 110
Ala Ile Val Val Gln Cys Ile Ile Leu Pro Leu Leu Gly Gly Ala Arg
        115                 120                 125
Asp Gln Ala Val Val Asp Glu Asn Val Ala Lys Leu Lys Lys Val Leu
    130                 135                 140
Glu Val Tyr Glu Ala Arg Leu Ser Ala Ser Arg Tyr Leu Ala Gly Asp
145                 150                 155                 160
Asp Ile Ser Leu Ala Asp Leu Ser His Phe Pro Phe Thr Arg Tyr Phe
                165                 170                 175
Met Glu Thr Glu Tyr Ala Pro Leu Val Ala Glu Leu Pro His Val Asn
            180                 185                 190
Ala Trp Trp Glu Gly Leu Lys Ala Arg Pro Ala Ala Arg Lys Val Thr
        195                 200                 205
Glu Leu Met Pro Pro Asp Leu Gly Leu Gly Lys Lys Ala Glu
    210                 215                 220
```

<210> 7
<211> 927
<212> DNA
<213> Triticum aestivum L.

<220>
<221> CDS
<222> (72)...(707)
<223> WIC 3, WIC 7, and WIC 8

<400> 7

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agcggcttta cctaccgaga agaagagaga aaaaaggttc gagtgcgttc cagagtgagg     60
agtgagaaga g atg gct ccg gtg aag ctg tac ggc gcg acc ctg tcg tgg     110
             Met Ala Pro Val Lys Leu Tyr Gly Ala Thr Leu Ser Trp
              1               5                  10
```

```
aac gtc acc agg tgc gtg gcg gcg ctg gag gag gcc ggc gtc cag tac      158
Asn Val Thr Arg Cys Val Ala Ala Leu Glu Glu Ala Gly Val Gln Tyr
     15                  20                  25

gag atc gta ccc atc aac ttc ggc acc ggc gag cac aag agc ccc gac      206
Glu Ile Val Pro Ile Asn Phe Gly Thr Gly Glu His Lys Ser Pro Asp
 30                  35                  40                  45

cac ctc gcc agg aac ccc ttc ggc cag gtg cca gct ttg cag gat ggt      254
His Leu Ala Arg Asn Pro Phe Gly Gln Val Pro Ala Leu Gln Asp Gly
                 50                  55                  60

gac tta tac gtc ttc gaa tca cgt gct att tgc aag tac gcg tgc cgc      302
Asp Leu Tyr Val Phe Glu Ser Arg Ala Ile Cys Lys Tyr Ala Cys Arg
             65                  70                  75

aag aac aag cca gag ctg ttg aag gag ggc gac atc aag gag tca gca      350
Lys Asn Lys Pro Glu Leu Leu Lys Glu Gly Asp Ile Lys Glu Ser Ala
         80                  85                  90

atg gtg gat gtg tgg ctc gag gtg gag gcc cat cag tac act gcc gct      398
Met Val Asp Val Trp Leu Glu Val Glu Ala His Gln Tyr Thr Ala Ala
     95                  100                 105

ctg agc ccc att ctc ttc gag tgc ctt atc cat cca atg ctt ggg gga      446
Leu Ser Pro Ile Leu Phe Glu Cys Leu Ile His Pro Met Leu Gly Gly
110                 115                 120                 125

gcc act gac cag aag gtc atc gac gac aac ctt gtt aag atc aag aac      494
Ala Thr Asp Gln Lys Val Ile Asp Asp Asn Leu Val Lys Ile Lys Asn
                130                 135                 140

gtg ctg gcg gtg tac gag gcg cac ctg agc aag tcc aag tac ctg gct      542
Val Leu Ala Val Tyr Glu Ala His Leu Ser Lys Ser Lys Tyr Leu Ala
            145                 150                 155

gga gac ttc ctc agt ctt gcg gac ctt aac cat gtg tct gtc acc ctg      590
Gly Asp Phe Leu Ser Leu Ala Asp Leu Asn His Val Ser Val Thr Leu
        160                 165                 170

tgc ttg gcg gct aca ccc tat gcg tct ctg ttc gac gcg tac ccg cat      638
Cys Leu Ala Ala Thr Pro Tyr Ala Ser Leu Phe Asp Ala Tyr Pro His
    175                 180                 185

gtg aag gcc tgg tgg act gac ctg ctg gcg agg ccg tcc gtc cag aag      686
Val Lys Ala Trp Trp Thr Asp Leu Leu Ala Arg Pro Ser Val Gln Lys
190                 195                 200                 205

gtc gca gcg ctg atg aag cca tgatcttaat tgctggtgct cgttcgtcgc         737
Val Ala Ala Leu Met Lys Pro
                210

gaaataagcc gaggtgtgtg ccccccgatg tgtgcctgta cgagtgtgtg ttcttgtgat    797
```

```
gtctcctcgt gttgaatgtt caggcttgtg cttgcgatcc tgtctcatct tttactgaaa     857
tgagcgttcc tatgctctgg tttaataata aattgtgcct agatattatc tcaaaaaaaa     917
aaaaaaaaaa                                                            927

      <210> 8
      <211> 212
      <212> PRT
      <213> Triticum aestivum L.

      <400> 8
Met Ala Pro Val Lys Leu Tyr Gly Ala Thr Leu Ser Trp Asn Val Thr
 1               5                  10                  15
Arg Cys Val Ala Ala Leu Glu Glu Ala Gly Val Gln Tyr Glu Ile Val
            20                  25                  30
Pro Ile Asn Phe Gly Thr Gly Glu His Lys Ser Pro Asp His Leu Ala
        35                  40                  45
Arg Asn Pro Phe Gly Gln Val Pro Ala Leu Gln Asp Gly Asp Leu Tyr
    50                  55                  60
Val Phe Glu Ser Arg Ala Ile Cys Lys Tyr Ala Cys Arg Lys Asn Lys
65                  70                  75                  80
Pro Glu Leu Leu Lys Glu Gly Asp Ile Lys Glu Ser Ala Met Val Asp
                85                  90                  95
Val Trp Leu Glu Val Glu Ala His Gln Tyr Thr Ala Ala Leu Ser Pro
            100                 105                 110
Ile Leu Phe Glu Cys Leu Ile His Pro Met Leu Gly Gly Ala Thr Asp
        115                 120                 125
Gln Lys Val Ile Asp Asp Asn Leu Val Lys Ile Lys Asn Val Leu Ala
    130                 135                 140
Val Tyr Glu Ala His Leu Ser Lys Ser Lys Tyr Leu Ala Gly Asp Phe
145                 150                 155                 160
Leu Ser Leu Ala Asp Leu Asn His Val Ser Val Thr Leu Cys Leu Ala
                165                 170                 175
Ala Thr Pro Tyr Ala Ser Leu Phe Asp Ala Tyr Pro His Val Lys Ala
            180                 185                 190
Trp Trp Thr Asp Leu Leu Ala Arg Pro Ser Val Gln Lys Val Ala Ala
        195                 200                 205
Leu Met Lys Pro
    210

      <210> 9
      <211> 866
      <212> DNA
      <213> Triticum aestivum L.

      <220>
      <221> CDS
      <222> (45)...(683)
      <223> WIC 5

      <400> 9
gaagcaggca acaggcgagc aggaaggaag caagagaggt ggag atg gcg ccc atc      56
                                                    Met Ala Pro Ile
                                                     1
```

```
aag ctg tac ggg atg atg ctg tcg gcc aac gtg acc cgc gtg acc acg      104
Lys Leu Tyr Gly Met Met Leu Ser Ala Asn Val Thr Arg Val Thr Thr
 5                  10                  15                  20

ctg ctc aac gag ctc ggc ctc gag ttc gac ttc gtc gac gtc gac ctc      152
Leu Leu Asn Glu Leu Gly Leu Glu Phe Asp Phe Val Asp Val Asp Leu
                25                  30                  35

cgc acc ggc gcc cac aag cac ccc gac ttc ctc aag ctc aac cct ttc      200
Arg Thr Gly Ala His Lys His Pro Asp Phe Leu Lys Leu Asn Pro Phe
            40                  45                  50

ggc cag atc ccc gcg ctg cag gac gga gac gaa gtt gtc ttc gag tcg      248
Gly Gln Ile Pro Ala Leu Gln Asp Gly Asp Glu Val Val Phe Glu Ser
        55                  60                  65

cgc gcc atc aac cgg tac atc gcg acc aag tac ggg gcg tcc ctg ctg      296
Arg Ala Ile Asn Arg Tyr Ile Ala Thr Lys Tyr Gly Ala Ser Leu Leu
    70                  75                  80

ccg acg ccg tcg gcc aag ctg gag gcg tgg ctg gag gtg gag tcg cac      344
Pro Thr Pro Ser Ala Lys Leu Glu Ala Trp Leu Glu Val Glu Ser His
85                  90                  95                  100

cac ttc tac ccg ccg gcg cgg acg ctg gtg tac gag ctg gtc atc aag      392
His Phe Tyr Pro Pro Ala Arg Thr Leu Val Tyr Glu Leu Val Ile Lys
                105                 110                 115

ccc atg ctg ggc gcc ccc acc gac gcc gcc gag gtg gac aag aac gcc      440
Pro Met Leu Gly Ala Pro Thr Asp Ala Ala Glu Val Asp Lys Asn Ala
            120                 125                 130

gcc gac ctc gcc aag ctg ctc gac gtc tac gag gcc cac ctc gcc gcc      488
Ala Asp Leu Ala Lys Leu Leu Asp Val Tyr Glu Ala His Leu Ala Ala
        135                 140                 145

ggg aac aag tac ctg gcc ggc gac gcc ttc ccg ctc gcc gac gcc aac      536
Gly Asn Lys Tyr Leu Ala Gly Asp Ala Phe Pro Leu Ala Asp Ala Asn
    150                 155                 160

cac atg tcc tac ctc ttc atg ctc acc aag agc ccc aag gcg gac ctg      584
His Met Ser Tyr Leu Phe Met Leu Thr Lys Ser Pro Lys Ala Asp Leu
165                 170                 175                 180

gtg gcc tcc cgc ccg cac gtc aag gcc tgg tgg gag gag atc tcc gcc      632
Val Ala Ser Arg Pro His Val Lys Ala Trp Trp Glu Glu Ile Ser Ala
                185                 190                 195

cgc ccc gcc tgg gcc aag acc gtc gcc tcc atc ccc ctc ccg ccc gcc      680
Arg Pro Ala Trp Ala Lys Thr Val Ala Ser Ile Pro Leu Pro Pro Ala
            200                 205                 210
```

gtc tgaggttgct tgtttggctg cggcgagaac ggaataaaat cgcgatgatg 733
Val

gaataaacaa ctttttagag aggaagcttg gaattcttgg tgttgctgct gttgaatgtt 793
gaatcttggt gttgaatgtt tacggcacat ctaatttatc cagtttttt ggcgtgaaaa 853
aaaaaaaaaa aaa 866

<210> 10
<211> 213
<212> PRT
<213> Triticum aestivum L.

<400> 10

```
Met Ala Pro Ile Lys Leu Tyr Gly Met Met Leu Ser Ala Asn Val Thr
 1               5                  10                  15
Arg Val Thr Thr Leu Leu Asn Glu Leu Gly Leu Glu Phe Asp Phe Val
            20                  25                  30
Asp Val Asp Leu Arg Thr Gly Ala His Lys His Pro Asp Phe Leu Lys
        35                  40                  45
Leu Asn Pro Phe Gly Gln Ile Pro Ala Leu Gln Asp Gly Asp Glu Val
    50                  55                  60
Val Phe Glu Ser Arg Ala Ile Asn Arg Tyr Ile Ala Thr Lys Tyr Gly
65                  70                  75                  80
Ala Ser Leu Leu Pro Thr Pro Ser Ala Lys Leu Glu Ala Trp Leu Glu
                85                  90                  95
Val Glu Ser His His Phe Tyr Pro Pro Ala Arg Thr Leu Val Tyr Glu
            100                 105                 110
Leu Val Ile Lys Pro Met Leu Gly Ala Pro Thr Asp Ala Ala Glu Val
        115                 120                 125
Asp Lys Asn Ala Ala Asp Leu Ala Lys Leu Leu Asp Val Tyr Glu Ala
    130                 135                 140
His Leu Ala Ala Gly Asn Lys Tyr Leu Ala Gly Asp Ala Phe Pro Leu
145                 150                 155                 160
Ala Asp Ala Asn His Met Ser Tyr Leu Phe Met Leu Thr Lys Ser Pro
                165                 170                 175
Lys Ala Asp Leu Val Ala Ser Arg Pro His Val Lys Ala Trp Trp Glu
            180                 185                 190
Glu Ile Ser Ala Arg Pro Ala Trp Ala Lys Thr Val Ala Ser Ile Pro
        195                 200                 205
Leu Pro Pro Ala Val
    210
```

<210> 11
<211> 897
<212> DNA
<213> Triticum aestivum L.

<220>
<221> CDS
<222> (15)...(668)
<223> WIC 4 and WIC 10

<221> gene
<222> (1)...(897)
<223> WIC 4 cDNA

<400> 11

```
aaccaaggga aaca atg gcg ccg gtg aag gtg ttc ggg ccg gcg atg tcg       50
                Met Ala Pro Val Lys Val Phe Gly Pro Ala Met Ser
                 1               5                  10

acc aac gtg gcc cgg gtg ctg gtg tgc ctg gag gag gtc ggc gcc gag       98
Thr Asn Val Ala Arg Val Leu Val Cys Leu Glu Glu Val Gly Ala Glu
         15                  20                  25

tac gag gtg gtc gac atc gat ttc aag gcc atg gag cac aag agc ccc      146
Tyr Glu Val Val Asp Ile Asp Phe Lys Ala Met Glu His Lys Ser Pro
     30                  35                  40

gag cat ctc gtc aga aac ccg ttc ggc caa atc cct gcc ttc cag gat      194
Glu His Leu Val Arg Asn Pro Phe Gly Gln Ile Pro Ala Phe Gln Asp
 45                  50                  55                  60

ggg gat ctg ctt ctc ttc gag tca cgc gca att gcg agg tac gtg ctc      242
Gly Asp Leu Leu Leu Phe Glu Ser Arg Ala Ile Ala Arg Tyr Val Leu
                 65                  70                  75

cgc aag tac aag aag aac gaa gtg gac ctg ctg agg gaa ggc gac ctc      290
Arg Lys Tyr Lys Lys Asn Glu Val Asp Leu Leu Arg Glu Gly Asp Leu
             80                  85                  90

aag gag gcg gcg atg gtg gac gta tgg acg gag gtg gac gcg cac acc      338
Lys Glu Ala Ala Met Val Asp Val Trp Thr Glu Val Asp Ala His Thr
         95                  100                 105

tac aac ccg gcc atc tcg ccg atc gtg tac gag tgc tca tca acc gct      386
Tyr Asn Pro Ala Ile Ser Pro Ile Val Tyr Glu Cys Ser Ser Thr Ala
    110                 115                 120

cat gcg cgg ctg ccg acc aac caa acg gtg gtg gac gag agc ctg gag      434
His Ala Arg Leu Pro Thr Asn Gln Thr Val Val Asp Glu Ser Leu Glu
125                 130                 135                 140

aag ctc aag aac gtg ctg gag gtc tac gag gcg cgc ctg tcc aag cac      482
Lys Leu Lys Asn Val Leu Glu Val Tyr Glu Ala Arg Leu Ser Lys His
                145                 150                 155

gac tac ctc gcc ggg gac ttc gtc agc ttc gcg gac ctc aac cac ttc      530
Asp Tyr Leu Ala Gly Asp Phe Val Ser Phe Ala Asp Leu Asn His Phe
            160                 165                 170

ccc tac acc ttc tac ttc atg gcc acg ccg cac gcg gcc ctc ttc gac      578
Pro Tyr Thr Phe Tyr Phe Met Ala Thr Pro His Ala Ala Leu Phe Asp
        175                 180                 185
```

```
tcg tac ccg cac gtc aag gcc tgg tgg gag agg atc atg gcg agg ccg      626
Ser Tyr Pro His Val Lys Ala Trp Trp Glu Arg Ile Met Ala Arg Pro
    190                 195                 200

gcc gtg aag aag ctc gcc gcg cag atg gtt ccc aag aag ccg            668
Ala Val Lys Lys Leu Ala Ala Gln Met Val Pro Lys Lys Pro
205                 210                 215

tgatttgcta ggcgggatct cgcatcgtgg gatccgattc cgatcactga tctgtgtggc   728
gttttctttt cttgttggtg tcgcgaataa ggcaaatgag ctcgtgtgtg tgtggctgga   788
attgcaccag cgtgcagttt ttgcgctttg cgtgtgtgtg gtcgtgaaaa ctcttgagat   848
ggaacaatgt cttcgtaatg ctttcacatt ttaaaaaaaa aaaaaaaaa               897
```

<210> 12
<211> 218
<212> PRT
<213> Triticum aestivum L.

<400> 12

```
Met Ala Pro Val Lys Val Phe Gly Pro Ala Met Ser Thr Asn Val Ala
 1               5                  10                  15
Arg Val Leu Val Cys Leu Glu Glu Val Gly Ala Glu Tyr Glu Val Val
            20                  25                  30
Asp Ile Asp Phe Lys Ala Met Glu His Lys Ser Pro Glu His Leu Val
        35                  40                  45
Arg Asn Pro Phe Gly Gln Ile Pro Ala Phe Gln Asp Gly Asp Leu Leu
    50                  55                  60
Leu Phe Glu Ser Arg Ala Ile Ala Arg Tyr Val Leu Arg Lys Tyr Lys
65                  70                  75                  80
Lys Asn Glu Val Asp Leu Leu Arg Glu Gly Asp Leu Lys Glu Ala Ala
                85                  90                  95
Met Val Asp Val Trp Thr Glu Val Asp Ala His Thr Tyr Asn Pro Ala
            100                 105                 110
Ile Ser Pro Ile Val Tyr Glu Cys Ser Ser Thr Ala His Ala Arg Leu
        115                 120                 125
Pro Thr Asn Gln Thr Val Val Asp Glu Ser Leu Glu Lys Leu Lys Asn
    130                 135                 140
Val Leu Glu Val Tyr Glu Ala Arg Leu Ser Lys His Asp Tyr Leu Ala
145                 150                 155                 160
Gly Asp Phe Val Ser Phe Ala Asp Leu Asn His Phe Pro Tyr Thr Phe
                165                 170                 175
Tyr Phe Met Ala Thr Pro His Ala Ala Leu Phe Asp Ser Tyr Pro His
            180                 185                 190
Val Lys Ala Trp Trp Glu Arg Ile Met Ala Arg Pro Ala Val Lys Lys
        195                 200                 205
Leu Ala Ala Gln Met Val Pro Lys Lys Pro
    210                 215
```

<210> 13
<211> 721
<212> DNA
<213> Triticum aestivum L.

<220>
<221> CDS
<222> (21)...(686)
<223> Glutathione S transferase

<221> gene
<222> (1)...(721)
<223> TA 27 cDNA

<400> 13

```
ttcggcacga ggaagaaggg atg gag cct atg aag gtg tac ggc tgg gcg gtg      53
                       Met Glu Pro Met Lys Val Tyr Gly Trp Ala Val
                        1               5                  10

tcg cca tgg atg gcg cgg gtc ctc gtc tcc ctg gag gag gcc ggc gcc      101
Ser Pro Trp Met Ala Arg Val Leu Val Ser Leu Glu Glu Ala Gly Ala
            15                  20                  25

gac tac gag ctc gtg ccc atg agc cgc aac ggc ggc gac cac cgg cgg      149
Asp Tyr Glu Leu Val Pro Met Ser Arg Asn Gly Gly Asp His Arg Arg
        30                  35                  40

ccg gag cac ctc gcc aga aac ccc ttc ggt gag atc ccg gtg ctc gaa      197
Pro Glu His Leu Ala Arg Asn Pro Phe Gly Glu Ile Pro Val Leu Glu
    45                  50                  55

tac ggc ggt ctg acg ctt tac caa tcc cgc gcc att gca agg cat att      245
Tyr Gly Gly Leu Thr Leu Tyr Gln Ser Arg Ala Ile Ala Arg His Ile
60                  65                  70                  75

ctc cgc aaa cac aag ccc ggg ctt cta gga gca ggc agc ctc gag gag      293
Leu Arg Lys His Lys Pro Gly Leu Leu Gly Ala Gly Ser Leu Glu Glu
                80                  85                  90

tcg gcg atg gtg gat gta tgg gtc gac gtg gat gcc cac cac ctg gag      341
Ser Ala Met Val Asp Val Trp Val Asp Val Asp Ala His His Leu Glu
            95                  100                 105

ccc gta ctc aag ccc atc gtg tgg aac tgc atc atc aac ccg ttc gtc      389
Pro Val Leu Lys Pro Ile Val Trp Asn Cys Ile Ile Asn Pro Phe Val
        110                 115                 120

ggg agg gac gtc gac cag ggc ctc gtc gat gag agc gtc gag aag ctc      437
Gly Arg Asp Val Asp Gln Gly Leu Val Asp Glu Ser Val Glu Lys Leu
    125                 130                 135

aag aag ctg ctg gag gtg tac gag gca aga ctg tca agc aac aag tac      485
Lys Lys Leu Leu Glu Val Tyr Glu Ala Arg Leu Ser Ser Asn Lys Tyr
140                 145                 150                 155

ttg gcc ggg gat ttc gtc agc ttc gcc gac ctc acc cat ttc tcc ttc      533
Leu Ala Gly Asp Phe Val Ser Phe Ala Asp Leu Thr His Phe Ser Phe
                160                 165                 170
```

```
atg cgc tac ttc atg gcg acg gag cat gcg gtt gtg ctc gat gcg tat      581
Met Arg Tyr Phe Met Ala Thr Glu His Ala Val Val Leu Asp Ala Tyr
            175                 180                 185

ccg cat gtg aag gca tgg tgg aag gcg ctg ctg gca agg cca tcg gtc      629
Pro His Val Lys Ala Trp Trp Lys Ala Leu Leu Ala Arg Pro Ser Val
        190                 195                 200

aag aag gtg ata gct ggc atg cct ccg gat ttt gga ttc ggg agc ggg      677
Lys Lys Val Ile Ala Gly Met Pro Pro Asp Phe Gly Phe Gly Ser Gly
    205                 210                 215

aga ata cca tgataaagca tgcttgtttg tctatgatgc tctga                  721
Arg Ile Pro
220
```

<210> 14
<211> 222
<212> PRT
<213> Triticum aestivum L.

<400> 14

```
Met Glu Pro Met Lys Val Tyr Gly Trp Ala Val Ser Pro Trp Met Ala
 1               5                  10                  15
Arg Val Leu Val Ser Leu Glu Glu Ala Gly Ala Asp Tyr Glu Leu Val
            20                  25                  30
Pro Met Ser Arg Asn Gly Gly Asp His Arg Arg Pro Glu His Leu Ala
        35                  40                  45
Arg Asn Pro Phe Gly Glu Ile Pro Val Leu Glu Tyr Gly Gly Leu Thr
    50                  55                  60
Leu Tyr Gln Ser Arg Ala Ile Ala Arg His Ile Leu Arg Lys His Lys
65                  70                  75                  80
Pro Gly Leu Leu Gly Ala Gly Ser Leu Glu Glu Ser Ala Met Val Asp
                85                  90                  95
Val Trp Val Asp Val Asp Ala His His Leu Glu Pro Val Leu Lys Pro
            100                 105                 110
Ile Val Trp Asn Cys Ile Ile Asn Pro Phe Val Gly Arg Asp Val Asp
        115                 120                 125
Gln Gly Leu Val Asp Glu Ser Val Glu Lys Leu Lys Lys Leu Leu Glu
    130                 135                 140
Val Tyr Glu Ala Arg Leu Ser Ser Asn Lys Tyr Leu Ala Gly Asp Phe
145                 150                 155                 160
Val Ser Phe Ala Asp Leu Thr His Phe Ser Phe Met Arg Tyr Phe Met
                165                 170                 175
Ala Thr Glu His Ala Val Val Leu Asp Ala Tyr Pro His Val Lys Ala
            180                 185                 190
Trp Trp Lys Ala Leu Leu Ala Arg Pro Ser Val Lys Lys Val Ile Ala
        195                 200                 205
Gly Met Pro Pro Asp Phe Gly Phe Gly Ser Gly Arg Ile Pro
    210                 215                 220
```

<210> 15
<211> 926
<212> DNA
<213> Triticum aestivum L.

<220>
<221> CDS
<222> (66)...(764)
<223> Glutathione S transferase

<221> gene
<222> (1)...(926)
<223> cDNA clone ICR

<400> 15

```
aaccactttc atcaacgtct cctacgctca ccgttcgttg ctccgcacat cagcaggact      60
tgcca atg gcg gga gac ggc gag ctg aag ctg ctg ggc gtg tgg acg agc     110
      Met Ala Gly Asp Gly Glu Leu Lys Leu Leu Gly Val Trp Thr Ser
       1               5                  10                  15

ccg ttc gtc atc agg gtg cgc gtg gtg ctc aac ctc aag tcg ctg ccg      158
Pro Phe Val Ile Arg Val Arg Val Val Leu Asn Leu Lys Ser Leu Pro
                  20                  25                  30

tac gag tac gtg gag gag agc ctg ggc agc aag agc gcg ctc ctc ctg      206
Tyr Glu Tyr Val Glu Glu Ser Leu Gly Ser Lys Ser Ala Leu Leu Leu
              35                  40                  45

ggc tcc aac ccg gtg cac cag agc gtg ccc gtc ctc ctc cac ggc ggc      254
Gly Ser Asn Pro Val His Gln Ser Val Pro Val Leu Leu His Gly Gly
          50                  55                  60

cgc ccc gtg aac gag tcc cag gtc atc gtg cag tac atc gac gag gtc      302
Arg Pro Val Asn Glu Ser Gln Val Ile Val Gln Tyr Ile Asp Glu Val
      65                  70                  75

tgg gcg ggg gcc ggc ccg tcc gtg ctc ccg gcc gac ccc tac gag cgc      350
Trp Ala Gly Ala Gly Pro Ser Val Leu Pro Ala Asp Pro Tyr Glu Arg
  80                  85                  90                  95

gcc acg gcg cgc ttc tgg gcg gcg tac gtc gac gac aag gtc ggg tcg      398
Ala Thr Ala Arg Phe Trp Ala Ala Tyr Val Asp Asp Lys Val Gly Ser
                 100                 105                 110

gcg tgg acg ggg atg ctc ttc tcg tgc aag acg gag gag gag cgg gcg      446
Ala Trp Thr Gly Met Leu Phe Ser Cys Lys Thr Glu Glu Glu Arg Ala
             115                 120                 125

gag gcg gtg tcc cgg gcc gtg gcg gcg ctg gag acc ctg gag ggc gcg      494
Glu Ala Val Ser Arg Ala Val Ala Ala Leu Glu Thr Leu Glu Gly Ala
         130                 135                 140

ttc gcg gag tgc tcc aag ggg aag gcg ttc ttc ggc ggc gac gcc atc      542
```

```
Phe Ala Glu Cys Ser Lys Gly Lys Ala Phe Phe Gly Gly Asp Ala Ile
    145                 150                 155

ggg ttc gtc gac gtc gtg ctt ggc ggc tac ctc ggc tgg ttc ggc gcg      590
Gly Phe Val Asp Val Val Leu Gly Gly Tyr Leu Gly Trp Phe Gly Ala
160                 165                 170                 175

atc gac aag atc atc ggg cgc cgg ctg atc gac ccg gcg agg acg ccg      638
Ile Asp Lys Ile Ile Gly Arg Arg Leu Ile Asp Pro Ala Arg Thr Pro
                180                 185                 190

ctg ctg gcc agg tgg gag gag cgg ttc cgc gcg gcg gac gcg gcc aag      686
Leu Leu Ala Arg Trp Glu Glu Arg Phe Arg Ala Ala Asp Ala Ala Lys
            195                 200                 205

ggc gtc gtg ccg gac gac gcc gac aag atg ctc gag ttc ttg ccc acc      734
Gly Val Val Pro Asp Asp Ala Asp Lys Met Leu Glu Phe Leu Pro Thr
        210                 215                 220

gtg ctc gct tgg atc gcc ggc aaa gcg aag tgaactgtgt ctgtgaggcc        784
Val Leu Ala Trp Ile Ala Gly Lys Ala Lys
    225                 230

gtgacatcgc cagctcgtga catgtgtgtt tgtgtgtgtc tgagtccgtc cagtgtgtgc    844
tgaataaatg caccgcatgt cgtgtgttgt accaagggca aacaatgctg aataattttg    904
ctgttaaaaa aaaaaaaaaa aa                                            926
```

<210> 16
<211> 233
<212> PRT
<213> Triticum aestivum L.

<400> 16

```
Met Ala Gly Asp Gly Glu Leu Lys Leu Leu Gly Val Trp Thr Ser Pro
 1               5                  10                  15
Phe Val Ile Arg Val Arg Val Val Leu Asn Leu Lys Ser Leu Pro Tyr
            20                  25                  30
Glu Tyr Val Glu Glu Ser Leu Gly Ser Lys Ser Ala Leu Leu Leu Gly
        35                  40                  45
Ser Asn Pro Val His Gln Ser Val Pro Val Leu Leu His Gly Gly Arg
    50                  55                  60
Pro Val Asn Glu Ser Gln Val Ile Val Gln Tyr Ile Asp Glu Val Trp
65                  70                  75                  80
Ala Gly Ala Gly Pro Ser Val Leu Pro Ala Asp Pro Tyr Glu Arg Ala
                85                  90                  95
Thr Ala Arg Phe Trp Ala Ala Tyr Val Asp Asp Lys Val Gly Ser Ala
            100                 105                 110
Trp Thr Gly Met Leu Phe Ser Cys Lys Thr Glu Glu Glu Arg Ala Glu
        115                 120                 125
Ala Val Ser Arg Ala Val Ala Ala Leu Glu Thr Leu Glu Gly Ala Phe
    130                 135                 140
Ala Glu Cys Ser Lys Gly Lys Ala Phe Phe Gly Gly Asp Ala Ile Gly
145                 150                 155                 160
```

```
Phe Val Asp Val Val Leu Gly Gly Tyr Leu Gly Trp Phe Gly Ala Ile
                165                 170                 175
Asp Lys Ile Ile Gly Arg Arg Leu Ile Asp Pro Ala Arg Thr Pro Leu
            180                 185                 190
Leu Ala Arg Trp Glu Glu Arg Phe Arg Ala Ala Asp Ala Ala Lys Gly
        195                 200                 205
Val Val Pro Asp Asp Ala Asp Lys Met Leu Glu Phe Leu Pro Thr Val
    210                 215                 220
Leu Ala Trp Ile Ala Gly Lys Ala Lys
225                 230
```

<210> 17
<211> 1043
<212> DNA
<213> Triticum aestivum L.

<220>
<221> CDS
<222> (39)...(767)
<223> Glutathione S transferase

<221> gene
<222> (1)...(1043)
<223> cDNA clones ICC, ICP, and ICV

<400> 17

```
aggacacgag tatcagggag gaagacgagg aaacgttg atg gcc ggc ggt gaa gag      56
                                          Met Ala Gly Gly Glu Glu
                                           1               5

ctg aag ctg ctg ggg tgg tgg gcg ccc ggg gtg agt ccc tac gtg ctg      104
Leu Lys Leu Leu Gly Trp Trp Ala Pro Gly Val Ser Pro Tyr Val Leu
             10                  15                  20

cgc gcc cag atg gcg ctc gcc gta aag ggg ctg agc tac gac tac ctc      152
Arg Ala Gln Met Ala Leu Ala Val Lys Gly Leu Ser Tyr Asp Tyr Leu
         25                  30                  35

ccc gag gac cgc tgg tcc acg agc gac ctc ctc atc gcg tcc aac ccc      200
Pro Glu Asp Arg Trp Ser Thr Ser Asp Leu Leu Ile Ala Ser Asn Pro
     40                  45                  50

gtg tac aag aag gtg ccc gtc ctc att cac aac ggc agg ccc gtc tgc      248
Val Tyr Lys Lys Val Pro Val Leu Ile His Asn Gly Arg Pro Val Cys
 55                  60                  65                  70

gag tcg ctg ctc atc ctg gag tac ctc gac gac gcc gtc ggc ctt gcc      296
Glu Ser Leu Leu Ile Leu Glu Tyr Leu Asp Asp Ala Val Gly Leu Ala
                 75                  80                  85

ggc aac ggc aag ccc atc ctc ccc gca gac ccc tac agc cgc gcc gtc      344
Gly Asn Gly Lys Pro Ile Leu Pro Ala Asp Pro Tyr Ser Arg Ala Val
             90                  95                 100
```

```
gct cgc ttc tgg gcc gcc tat gtg aac gac aag ctg ttc cct tcg tgc      392
Ala Arg Phe Trp Ala Ala Tyr Val Asn Asp Lys Leu Phe Pro Ser Cys
        105                 110                 115

acc ggg atc ctc aag act acg aag cag gag gag aga gcc ggt aag atg      440
Thr Gly Ile Leu Lys Thr Thr Lys Gln Glu Glu Arg Ala Gly Lys Met
    120                 125                 130

gag gag acc ctg tcc ggg ctc aga cac tta gaa gct gtc atg gcg gag      488
Glu Glu Thr Leu Ser Gly Leu Arg His Leu Glu Ala Val Met Ala Glu
135                 140                 145                 150

tgc tcc gaa ggg gag gcg gag gcg ccg ttc ttc ggt ggt gac gcc atc      536
Cys Ser Glu Gly Glu Ala Glu Ala Pro Phe Phe Gly Gly Asp Ala Ile
                155                 160                 165

ggg ttc ctc gac atc gcg ctc ggg tgc tat ctt ccc tgg ttt gag gca      584
Gly Phe Leu Asp Ile Ala Leu Gly Cys Tyr Leu Pro Trp Phe Glu Ala
            170                 175                 180

gca ggc cgc ctg gcc ggc ttg ggg ccg atc atc gac ccg gcg agg acg      632
Ala Gly Arg Leu Ala Gly Leu Gly Pro Ile Ile Asp Pro Ala Arg Thr
        185                 190                 195

ccg aaa cta gct gcg tgg gcg gag cgg ttc agc gtc gcc gag ccg atc      680
Pro Lys Leu Ala Ala Trp Ala Glu Arg Phe Ser Val Ala Glu Pro Ile
    200                 205                 210

aag gcg ctg ctg cct ggg gtc gac aag ctg gag gag tac atc act acg      728
Lys Ala Leu Leu Pro Gly Val Asp Lys Leu Glu Glu Tyr Ile Thr Thr
215                 220                 225                 230

gcg ctt tat cca aag tgg aac atc gcg gtc acc ggc aac taattaaaga       777
Ala Leu Tyr Pro Lys Trp Asn Ile Ala Val Thr Gly Asn
                235                 240

tcttgtcgtt ccactatggc aaaagaaata aaaaagggcg tcgttcgata accggcggag    837
gatctctgcc ttgtgagtag ctgttttcac gtcaagagtt gaactgttac tactaagtcg    897
ggtttctttt tgcgagggtt agtgggtcgt ggtcatgaat aatgcacagg cgtgcactct    957
cttcgatctg agttgtgata tgttgtttcg tgaataaatt gaagcgtcgt cgatcttgca   1017
tctaaaaaaa aaaaaaaaaa aaaaaa                                        1043
```

<210> 18
<211> 243
<212> PRT
<213> Triticum aestivum L.

<400> 18

```
Met Ala Gly Gly Glu Glu Leu Lys Leu Leu Gly Trp Trp Ala Pro Gly
 1               5                  10                  15
Val Ser Pro Tyr Val Leu Arg Ala Gln Met Ala Leu Ala Val Lys Gly
            20                  25                  30
```

Leu Ser Tyr Asp Tyr Leu Pro Glu Asp Arg Trp Ser Thr Ser Asp Leu
35 40 45
Leu Ile Ala Ser Asn Pro Val Tyr Lys Lys Val Pro Val Leu Ile His
50 55 60
Asn Gly Arg Pro Val Cys Glu Ser Leu Leu Ile Leu Glu Tyr Leu Asp
65 70 75 80
Asp Ala Val Gly Leu Ala Gly Asn Gly Lys Pro Ile Leu Pro Ala Asp
85 90 95
Pro Tyr Ser Arg Ala Val Ala Arg Phe Trp Ala Ala Tyr Val Asn Asp
100 105 110
Lys Leu Phe Pro Ser Cys Thr Gly Ile Leu Lys Thr Thr Lys Gln Glu
115 120 125
Glu Arg Ala Gly Lys Met Glu Glu Thr Leu Ser Gly Leu Arg His Leu
130 135 140
Glu Ala Val Met Ala Glu Cys Ser Glu Gly Glu Ala Glu Ala Pro Phe
145 150 155 160
Phe Gly Gly Asp Ala Ile Gly Phe Leu Asp Ile Ala Leu Gly Cys Tyr
165 170 175
Leu Pro Trp Phe Glu Ala Ala Gly Arg Leu Ala Gly Leu Gly Pro Ile
180 185 190
Ile Asp Pro Ala Arg Thr Pro Lys Leu Ala Ala Trp Ala Glu Arg Phe
195 200 205
Ser Val Ala Glu Pro Ile Lys Ala Leu Leu Pro Gly Val Asp Lys Leu
210 215 220
Glu Glu Tyr Ile Thr Thr Ala Leu Tyr Pro Lys Trp Asn Ile Ala Val
225 230 235 240
Thr Gly Asn

<210> 19
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer to introduce NdeI site into translation start site of ICJ

<400> 19
aggtagttac atatggccgg agga